

IN THE SPECIFICATION

On page 2, lines 1-20, replace the entire paragraph with the following paragraph as amended.

FIG.2 shows a GPS receiver 100, which includes an oscillator 101. Oscillator 101 provides a signal of a particular frequency to phase comparator 146. Phase comparator 146 also receives input from frequency divider 136 and outputs a signal to loop filter 145. Loop filter 145 provides a signal to voltage controlled oscillator (VCO) 115 which generates an output signal whose frequency is contingent upon the signal input from loop filter 145. The signal from VCO 115 is provided to mixer 110 where it is combined with a radio frequency (RF) signal from low noise amplifier (LNA) 105 to produce a first intermediate frequency (IF) signal S1. The first IF signal S1 is provided to variable amplifier 112 and then on to mixer 120 and mixer 121. In mixer 120, the signal S1 is combined with a signal S2 from frequency divider 130 to produce an in-phase second IF frequency output signal S3. In mixer 121, the signal S1 is combined with a signal S4 from frequency divider 130 to produce a quadrature-phase second IF frequency output signal S5. Signal S3 is provided to comparator and A to D processor 125 to produce a digitized signal I for output to GPS baseband section 150. Signal S5 is provided to comparator and A to D processor 126 to produce a digitized signal Q for output to GPS baseband section 150. Frequency divider 130 also provides its output signal S4 to frequency divider 135 and frequency divider 136. The output from VCO 115 is also provided to the frequency divider 130. Frequency divider 130 outputs a signal ~~S4S5~~ that is mixed by mixer 121 with a signal S1 to produce a signal ~~S5S4~~.

On page 2, lines 21-25, replace the entire paragraph with the following paragraph as amended.

As two separate oscillators are provided within the same personal communications device 10, printed circuit board and/or integrated circuit real estate is devoted to accommodating each oscillator. Another disadvantage is that and-power consumption of the two oscillators is greater than for one oscillator. Thus it is desirable to have a personal communications device that overcomes the stated disadvantages

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unaddressed need exists in the industry to address the previous mentioned deficiencies and inadequacies.

5 On page 3, lines 17-21, replace the entire paragraph with the following paragraph as amended.

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Other systems, methods, features, and advantages of the invention are available will be or become apparent to one with skill in the art upon examination of the following figures and detailed description. It is intended that all such additional systems, methods, features, and advantages be included within this description, be within the scope of the
10 invention, and be protected by the accompanying claims.

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On page 3, line 33, replace the entire paragraph with the following paragraph as amended.

15 FIG. 5 is a schematic diagram of a fractional-N frequency Fractional N synthesizer.

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On page 4, line 8 – page 5, line 28, replace the text with the following text as amended.

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The invention seeks to provide a personal communications device 4010 having
20 global positioning system (GPS) capabilities. The invention seeks to provide a personal communications device 10 in which a single oscillator 201 acts as a clock source for both mobile telephone circuitry 200 and global positioning system (GPS) circuitry 100. GPS circuitry 100 includes fractional synthesizer provisions for controlling the generation of the frequency of signals based upon the oscillator 201.

25 FIG. 3 shows a block diagram of a personal communications device 4010 according to an embodiment of the invention. There is provided a global positioning system (GPS) receiver 404100 and a code division multiple access (CDMA) base telecommunications unit 402200. GPS receiver 404100 includes a GPS radio 412102 and a GPS baseband unit 414103. GPS radio 412102 receives and processes GPS signals and
30 provides them the baseband unit 414103 for further extraction of data from a received

GPS signal. There is also provided a CDMA radio unit 408202 for receiving, processing and transmitting CDMA based RF signals and a CDMA baseband unit 410203 for further processing of CDMA based RF signal received or to be transmitted. CDMA telecommunications unit 402200 includes an oscillator 406201 for providing a clock signal to circuitry of CDMA telecommunications unit 402200 and to GPS receiver 404100. More particularly CDMA oscillator 406201 provides a clock signal to CDMA radio 408202, CDMA baseband unit 410203 and to GPS receiver 412402 and GPS baseband unit 414103.

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FIG. 4 shows a diagram detailing GPS receiver 404100. There is provided a voltage controlled oscillator (VCO) 515115 which generates a GPS system clock signal Z4 whose frequency is contingent upon the voltage input from loop filter 545145. The signal from VCO 515115 is provided to mixer 510110 where it is combined with a received radio frequency (RF) input signal from low noise amplifier (LNA) 505105 to produce a first intermediate frequency (IF) signal S14. This first IF signal S14 is provided to amplifier 512112 and then to mixer 520120 and mixer 521121. At mixer 520120, it is combined with a signal S24 from frequency divider 530130 to produce a second IF frequency output signal S34. At mixer 521121, ~~first~~second IF frequency output signal S14 is combined with a signal S44 also from frequency divider 530130 to produce a further IF frequency output signal S54. Signal S44 is also provided to frequency divider 535135 where it is converted into a signal of alternate frequency S64 and output to GPS baseband unit 414150.

Signal S34 is input to comparator and A to D processor 525125 where it is processed and converted into a digital output signal I4 for input to GPS baseband unit 414150. Likewise signal S54 is input to comparator and A to D processor 526126 where it is processed and converted into digital output signal Q4 which is provided to GPS baseband unit 414150.

The GPS system clock signal Z4 output from VCO 515115 is also provided to frequency divider 530130 and a frequency synthesizer 516116. Frequency synthesizer/divider 116 converts the signal Z4 from VCO 115 into a feedback signal S74 that is provided to phase comparator 546146 which outputs a control signal S94 to loop

filter 545145 in response to the input of the feedback signal S74 and the clock signal S84 from oscillator 406201. Control signal S94 is then provided to VCO 515115, which adjusts the frequency of output signal Z4 in accordance with the control signal S94. In this illustration it can be seen that there is formed a feedback loop composed of frequency synthesizer 516116, phase comparator 546146 and loop filter 545145.

FIG. 5 is a block diagram of the phase interpolated fractional N frequency synthesizer 516116. The synthesizer 516116 can be implemented as an integrated circuit using known CMOS fabrication methods or other compatible semiconductor chip technologies. In FIG. 5, a reference signal Z4 from VCO 515115 is provided to an input of a phase detector 322. The output of the phase-detector 322 is provided to a loop filter 324. The output of the loop filter 324 is provided to a controlled oscillator 326, such as a VCO, which has an output S74 (feedback signal S74) that is the output of the synthesizer 516116. The signal S74 is supplied to a fractional-N divider 328. A control word K is supplied to the fractional-N divider 328 in order to set the value of the divisor N.

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On page 7, line 27 – page 8, line 2, replace the entire paragraph with the following paragraph as amended.

FIG. 8 illustrates an alternate embodiment of a GPS receiver 600 in which provisions are made for selectively providing feedback to phase comparator 650146 via a fractional N synthesizer 516116 or a frequency divider 536136. In this embodiment a switch 550250 is provided for switching between the output of fractional N synthesizer 516116 or frequency divider 536136 for input to phase comparator 650146. Switch 550250 may be a multiplexor or other logic gating. Further, switch 550250 can be permanently set to a desired position during manufacture or could remain selectively switchable and controllable via application of an appropriate switching signal, generated for example by a GPS baseband unit 614.

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On page 1, line 1, replace the text with the following text as amended.

What is claimed is ~~Therefore, having thus described the invention, at least the~~ following is claimed:

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